No. 9500318

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Board of Regents, University of Nebraska and
Agricultural Research Service, USDA

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR [R]PRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR [S]TOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT [V]ARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE [U]NITED STATES SEED OF THIS VARIETY (I) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED [SEED] (II) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. ([7] U.S.C. 2401, AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Niobrara'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirty-first day of July in the year of our Lord one thousand nine hundred and ninety-six.

Attest:

Marsha A. Stanbe
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Dan Glickman
Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and edition date on all reproductions.* OMB APPROVED NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(INSTRUCTIONS ON REVERSE)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate)
Board of Regents, University of Nebraska and Agricultural Research Service, USDA

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
NE89522

3. VARIETY NAME
Niobrara

4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP)
Lincoln, NE 68583-0745
Washington, D.C. 20250

5. PHONE (include area code)
402-472-3906
202-720-3656

FOR OFFICIAL USE ONLY
PVPO NUMBER 9500318

FILING
Date Sept. 27, 1995
Time ☐ A.M. ☐ P.M.

FEES RECEIVED
Filing and Examination Fee: $ 2450.00
Date Sept. 27, 1995
Certificate Fee: $ 300.00
Date July 5, 1996

6. GENUS AND SPECIES NAME
Triticum aestivum L.

7. FAMILY NAME *(Botanical)*
Graminae

8. CROP KIND NAME *(Common Name)*
Hard Red Winter Wheat

9. DATE OF DETERMINATION
July, 1989

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)
Corporation and U.S. Government Agency

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Nebraska and District of Columbia

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Dr. D.W. Nelson, Dean and Director
Agricultural Research Division, IANR-UNL
Lincoln, NE 68583-0704

Telephone: 402-472-2045

Dr. R.D. Plowman, Administrator
USDA, ARS, OA Administration Bldg., Rm. 302A
Washington, D.C. 20250

PHONE (include area code): 202-720-3656

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow* **INSTRUCTIONS** *on reverse)*

a. ☒ Exhibit A, Origin and Breeding History of the Variety
b. ☒ Exhibit B, Novelty Statement
c. ☒ Exhibit C, Objective Description of Variety
d. ☒ Exhibit D, Additional Description of Variety
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership
f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
g. ☒ Filing and Examination Fee ($2,325) made payable to "Treasurer of the United States"

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act)* ☒ YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____).
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☒ YES (If "YES," GIVE NAMES OF COUNTRIES AND DATES) United States, ~~September 1994~~ January 1995 AAA (per letter) 11 Jan 1996
☐ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT [Owner(s)]	CAPACITY OR TITLE	DATE
Daniel W Nelson	Dean & Director Nebraska Ag Exp Station	8/21/95
SIGNATURE OF APPLICANT [Owner(s)]	CAPACITY OR TITLE	DATE
K E Murrell	Acting Administrator ARS, USDA	SEP 14 1995

SD-470 (06-93) *Editions of Forms LS-470 (3/86) and CSSD-470 (5/89) are to be destroyed.*

CONTINUED ON REVERSE

'Niobrara' (P.I. 584996) Hard Red Winter Wheat Application

Exhibit A. Origin and Breeding History:

Niobrara is an F_3-derived line that was identified in 1989 and tested as NE89522. Niobrara was released primarily for its high yield potential and resistance to diseases and insects in its area of adaptation. Niobrara was selected from the cross 'TAM 105'*4/'Amigo'//'Brule' sel which was made in 1983 by Dr. J. W. Schmidt. The F_1 generation was grown in the greenhouse in 1984. The F_2 and F_3 generations were grown in bulk at Mead, Nebraska in 1985 and 1986, respectively. Random heads were chosen from the F_3 bulk and planted as head rows which were harvested in 1987. The F_3-derived F_5 family was harvested as a single observation plot in 1988. In 1989, Niobrara was grown in six locations in unreplicated trials in Nebraska. Niobrara was identified in these trials as NE89522. It has been tested in replicated trials from 1990 to present. In addition, it has been tested in the USDA Northern Regional Performance Nursery in 1992 and 1993. The criteria for selection were: a) adequate winterhardiness for propagation in Nebraska, b) resistance to Puccinia graminis (the causal agent of stem rust), c) agronomic performance equal or superior to commonly grown wheat varieties, and d) acceptable end-use quality (in this case for bread making). The initial allocation of Foundation seed of the experimental line (NE89522) to certified growers was made in September, 1994 to produce adequate quantities of certified seed (subject to the release of the experimental line). Niobrara was named and released in January, 1995 by the Nebraska Agricultural Experiment Station, the South Dakota Agricultural Experiment Station, and the Agricultural Research Service, U.S. Department of Agriculture. The first public sale of certified seed was in August, 1995.

Niobrara will be maintained by the Nebraska Agricultural Experiment Station with the following classes: Breeder, Foundation, Registered, and Certified. Breeder seed will be maintained by roguing Breeder Seed fields. The U.S. Department of Agriculture will not have seed for distribution.

Niobrara appears stable and uniform over eight generations of selfing and during seed increase. Less than 0.1 percent of the plants were rogued from Foundation and Breeder seed Fields. It is expected that less than 0.1% (1:1000) variant plants (that are taller, 5 to 10 cm taller and/or red-chaff) may be encountered in subsequent generations.

Exhibit B. Novelty Statement

Niobrara is most similar to the hard red winter wheat cultivars, Redland and TAM107, but it can be distinguished by the following characteristics.

1. Niobrara is moderately susceptible to leaf rust (caused by Puccinia recondita Roberge ex Desmaz.) whereas Redland contains Lr16 which conveys a higher level of leaf rust resistance.

2. In data provided by Dr. Jim Hatchet, USDA-ARS and Department of Entomology, Kansas State University, Manhattan, KS 66506, Niobrara is susceptible to the Great Plains biotype of Hessian fly (Mayetiola destructor Say). Redland is resistant to the Great Plains Biotype.

3. Niobrara is white (Munsell 10YR 8/2) chaffed whereas TAM107 is bronze (Munsell 5YR 6/6) chaffed.

4. In replicated trials, involving 10 environments (5 locations in 1992 and 5 locations in 1993), Niobrara averaged 10 cm taller than TAM107. The variances for genotypes among the environments were homogeneous, hence a combined analysis of variance can be undertaken. In fact, data from 8 of the 10 environments were used in a published study that determined that the variances were homogeneous and that measuring as few as two replications in an environment was sufficient to differentiate lines that were 6 cm different in height (Budak,

N., P. S. Baenziger, and K. M. Eskridge. 1995. Effect of replications on measuring wheat plant height. Can. J. Plant Sci. 75:171-173). A protected LSD (p=0.05) for plant height for the mean line values using data from the 10 environments was less than 3.2 cm. Hence the plant height difference between Niobrara and TAM107 is greater than 3 times the LSD value. As plant height can be influenced by the environment, an Eberhart and Russell stability measurement was also made. The stability regression coefficient for Niobrara was 0.95 with a standard error of 0.06 while the stability regression coefficient for TAM107 was 0.97 with a standard error of 0.06. The similarity of the stability regression coefficients indicate that no crossover interactions exists for these two lines (i.e. Niobrara is always taller than TAM107). The stability analysis and procedures are described in Budak, N., P. S. Baenziger, K. M. Eskridge, D. Baltensperger, and B. Moreno-Sevilla. 1995. Plant height response of semidwarf and nonsemidwarf wheats to the environment. Crop Sci. 35: 447-451.

Exhibit C. See Attached Sheet

Exhibit D. Additional Description of the Variety:

Niobrara is an awned, white-glumed cultivar. The foliage is green, with a waxy bloom at anthesis. The spike is middense and tapering. The glume is midlong and wide. The glume shoulder is narrow and square. The beak is short. Kernels are red colored, hard textured, and ovate. The kernel has no collar, rounded cheeks, midsize germ, large brush of short length, and a narrow and shallow crease.

Niobrara was tested in Nebraska yield trials starting in 1990, and the Northern Regional Performance Nursery in 1992 and 1993. Niobrara has had an excellent yield performance record in Nebraska. It was the highest grain yielding line in the Nebraska Fall Sown Small Grains Variety Trials in each year that it was tested (1993 and 1994, 26 environments). The average grain yield was 3890 kg/ha for Niobrara which was superior to 'Alliance' (3830 kg/ha), 'Vista' (3700 kg/ha), 'Redland' (3690 kg/ha) and 'Siouxland' (3450 kg/ha). Niobrara also had the highest average yield of the fifteen lines tested in both 1992 and 1993 in the Uniform Northern Regional Performance Nursery (28 environments). In the 4 yr (1991-1994, 20 environments) that Niobrara (3180 kg/ha) has been tested in the Nebraska Intrastate Nursery, only 'Alliance' (3260 kg/ha) had a superior yield record. For comparison, the grain yield of Redland, Vista, Arapahoe, and TAM107 were 3070, 3040, 3000, and 2840 kg/ha, respectively. The recommended growing region for Niobrara is southwest Nebraska, northern Nebraska, and the Nebraska panhandle where its winterhardiness, plant height, tolerance for cooler weather, and disease resistance are most effective.

Niobrara is a semidwarf cultivar that is 11 cm taller than Vista (74 cm), 5 cm taller than Alliance (80 cm) and similar in height to Redland (84 cm), a taller, semidwarf cultivar. The straw strength of Niobrara is superior to Arapahoe, but less than Redland, Siouxland, TAM 107, 'Abilene', and 'Thunderbird'. Niobrara has an intermediate coleoptile length (similar to TAM107), but the coleoptile is 30% shorter than the coleoptile of Scout 66. The winterhardiness of Niobrara is adequate for Nebraska growing conditions, superior to 'Vona', 'TAM 200', and 'Rawhide', and similar to Scout 66. Niobrara is a medium maturity wheat (two days later than Alliance and two days earlier than Redland).

Niobrara is heterogeneous for secalins encoded by the Sec-1 locus which is indicative of the Amigo translocation (1A/1R). Niobrara has exhibited moderate resistance to stem rust (caused by Puccinia graminis Pers. : Pers.) and carries Sr6 and is heterogeneous for the Amigo gene. Niobrara is moderately susceptible to leaf rust (caused by Puccinia recondita Roberge ex Desmaz.) and is susceptible to the Great Plains biotype of Hessian fly (Mayetiola destructor Say) and soilborne wheat mosaic virus. Its reaction to wheat streak mosaic virus needs further testing, however, under artificial inoculation in greenhouse evaluations, it appears to be slightly less tolerant than Redland, but superior to many Nebraska released cultivars. The Amigo translocation may also confer non-preference to the virus vector, (wheat curl mite, Aceria tulipae Kiefer).

The grain volume weight of Niobrara is similar to Alliance, superior to Redland, but lower than Arapahoe, Siouxland, and Nekota. The milling and baking properties of Niobrara

were determined using 5 yr of testing by the Nebraska Wheat Quality Laboratory with Arapahoe and Scout 66 as check cultivars. The average wheat and flour protein content of Niobrara is lower than Arapahoe and similar to Scout 66. The flour yield is less than Scout 66, but higher than Arapahoe. The dough mixing properties were similar to Arapahoe and stronger than Scout 66. While the baking absorption of Niobrara was less than Arapahoe and Scout 66, average loaf volumes were greater than the two check cultivars. The external appearance and internal attributes of the baked bread loaf indicated generally acceptable quality characteristics.

Exhibit E. Statement of the Basis of the Applicant's Ownership

The University of Nebraska and the USDA/ARS are the applicants for protection in the case of Niobrara hard red winter wheat being the variety for which Plant Variety Protection is hereby sought was developed by Drs. P. S. Baenziger, B. Moreno-Sevilla, J. W. Schmidt, and D. Shelton, employees of the University of Nebraska, and C. J. Peterson, an employee of USDA-ARS. By agreement between employees of the University of Nebraska and by agreement between USDA-ARS and the University of Nebraska, all rights to any invention, discovery, or development made by employees while employed by the University of Nebraska or by USDA-ARS employees stationed at the University of Nebraska, are jointly assigned to the University of Nebraska and USDA-ARS, with no rights of any kind to Niobrara being retained by the employees.

9500318

Exhibit E
Statement of the basis of ownership

1. Does the applicant own all rights to the variety? Yes ✓ No____
   If no, please explain.

2. Is the applicant (individual or company) a U.S. national or U.S. based company? Yes____ No ✓
   If no, give country _____

3. Is the applicant the original breeder? Yes ✓ No____
   If no, please answer the following:
   a. If original rights to variety were owned by individual(s):
      Is (are) the original breeder(s) a U.S. national(s)? Yes____ No____
      If no, give country _____
   b. If original rights to variety were owned by a company:
      Is the original breeder a U.S. based company? Yes____ No____
      If no, give country _____

Note:

Plant variety protection can be afforded only to variety owners (not licensees) who meet the following criteria.

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original breeder, both the original breeder and the applicant must meet the above criteria.

The original breeder may be the individual or company who directed final breeding. See PVPA Section 41(a)(2) for definition.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*Triticum* spp.)

NAME OF APPLICANT(S) Board of Regents, University of Nebraska and Agricultural Research Service, USDA

ADDRESS (*Street and No. or R.F.D. No., City, State, and Zip Code*)
Lincoln, NE 68583-0745
Washington, D.C. 20250

FOR OFFICIAL USE ONLY
PVPO NUMBER 9500318

VARIETY NAME
NIOBRARA

TEMPORARY OR EXPERIMENTAL DESIGNATION
NE89522

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [ ][ ][ ] or [ ][ ]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used: _____.

Please answer all questions for your variety; lack of response may delay progress of your application.

1. KIND:

[1] 1=Common 2=Durum 3=Club 4=Other (SPECIFY) _____

2. VERNALIZATION:

[2] 1=Spring 2=Winter 3=Other (SPECIFY) _____

3. COLEOPTILE ANTHOCYANIN:

[1] 1=Absent 2=Present

4. JUVENILE PLANT GROWTH:

[2] 1=Prostrate 2=Semi-erect 3=Erect

5. PLANT COLOR (boot stage):

[2] 1 = Yellow-Green 2 = Green 3 = Blue-Green

6. FLAG LEAF (boot stage):

[2] 1 = Erect 2 = Recurved

[1] 1 = Not Twisted 2 = Twisted

7. EAR EMERGENCE:

[0][2] Number of Days Earlier Than REDLAND *

[0][2] Number of Days Later Than ALLIANCE *

8. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

9. PLANT HEIGHT (from soil to top of head, excluding awns):

[0][5] cm Taller Than ALLIANCE *

[0][1] cm Shorter Than REDLAND *

* Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial

10. STEM:

A. ANTHOCYANIN
[1] 1= Absent 2=Present

B. WAXY BLOOM
[2] 1=Absent 2=Present

C. HAIRINESS (last internode of rachis)
[1] 1=Absent 2=Present

D. INTERNODE (SPECIFY NUMBER) 5
[1] 1=Hollow 2=Semi-solid 3=Solid

E. PEDUNCLE
[2] 1=Absent 2=Present

[ ] cm Length

11. HEAD (at Maturity):

A. DENSITY
[2] 1=Lax 2=Middense 3= Dense

B. SHAPE
[1] 1 = Tapering 2= Strap 3 = Clavate 4 = Other (SPECIFY) _____

C. CURVATURE
[2] 1 = Erect 2 = Inclined 3 = Recurved

D. AWNEDNESS
[4] 1 = Awnless 2 = Apically Awnletted 3 = Awnletted 4 = Awned

12. GLUMES (at Maturity):

A. COLOR
[1] 1 = White 2 = Tan 3 = Other (SPECIFY) _____

B. SHOULDER
[4] 1 = Wanting 2 = Oblique 3 = Rounded 4 = Square 5 = Elevated 6 = Apiculate

C. BEAK
[3] 1 = Obtuse 2 = Acute 3 =Acuminate

D. LENGTH
[2] 1 = Short (ca. 7mm) 2 = Medium (ca. 8mm) 3 = Long (ca. 9mm)

E. WIDTH
[3] 1 = Narrow (ca. 3mm) 2 = Medium (ca. 3.5mm) 3 = Wide (ca. 4mm)

13. SEED:

A. SHAPE
[1] 1 = Ovate 2 = Oval 3 = Elliptical

B. CHEEK
[1] 1=Rounded 2=Angular

C. BRUSH
[1] 1=Short 2=Medium 3=Long

D. CREASE
[1] 1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[1] 1 = Not Collared 2 = Collared

[1] 1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

13. **SEED:** (continued)

E. COLOR

[3] 1 = White 2 = Amber 3 = Red 4 = Other (SPECIFY) _____

F. TEXTURE

[1] 1=Hard 2=Soft

G. PHENOL REACTION *(see instructions)*:

[5] 1 = Ivory 2 = Fawn 3 = Light Brown 4 = Dark Brown 5 = Black

14. **DISEASE:** (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED

Stem Rust *(Puccinia graminis* f. sp. *tritici)*
[2] TMNK

Stripe Rust *(Puccinia striiformis)*
[0]

Tan Spot *(Pyrenophora tritici-repentis)*
[1] FIELD

Halo Spot *(Selenophoma donacis)*
[0]

Septoria nodorum (Glume Blotch)
[1] FIELD

Septoria avenae (Speckled Leaf Disease)
[0]

Septoria tritici (Speckled Leaf Blotch)
[1] FIELD

Scab (*Fusarium* spp.)
[0]

"Black Point" (Kernel Smudge)
[0]

Barley Yellow Dwarf Virus (BYDV)
[0]

Soilborne Mosaic Virus (SBMV)
[1] FIELD

Wheat Yellow (Spindle Streak) Mosaic Virus
[0]

Wheat Streak Mosaic Virus (WSMV)
[1] SIDNEY ISOLATE

Other (SPECIFY) _____
[ ]

Other (SPECIFY) _____
[ ]

Other (SPECIFY) _____
[ ]

Leaf Rust *(Puccinia recondita* f. sp. *tritici)*
[3] FIELD STRAINS

Loose Smut *(Ustilago tritici)*
[0]

Flag Smut *(Urocystis agropyri)*
[0]

Common Bunt *(Tilletia tritici* or *T. laevis)*
[0]

Dwarf Bunt *(Tilletia controversa)*
[0]

Karnal Bunt *(Tilletia indica)*
[0]

Powdery Mildew *(Erysiphe graminis* f. sp. *tritici)*
[0]

"Snow Molds"
[0]

Common Root Rot *(Fusarium, Cochliobolus* and *Bipolaris* spp.)
[0]

Rhizoctonia Root Rot *(Rhizoctonia solani)*
[0]

Black Chaff *(Xanthomonas campestris* pv. *translucens)*
[0]

Bacterial Leaf Blight *(Pseudomonas syringae* pv. *syringae)*
[0]

Other (SPECIFY) _____
[ ]

Other (SPECIFY) _____
[ ]

Other (SPECIFY) _____
[ ]

Other (SPECIFY) _____
[ ]

8

15. INSECT: (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

Hessian Fly *(Mayetiola destructor)*
[3] GREAT PLAINS BIOTYPE

Stem Sawfly *(Cephus spp.)*
[0]

Cereal Leaf Beetle *(Oulema melanopa)*
[0]

Russian Aphid *(Diuraphis noxia)*
[1]

Greenbug *(Schizaphis graminum)*
[0]

Aphids
[0]

Other (SPECIFY) [ ]

Other (SPECIFY) [ ]

Other (SPECIFY) [ ]

Other (SPECIFY) [ ]

Other (SPECIFY) [ ]

Other (SPECIFY) [ ]

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS:

HARD RED WINTER WHEAT

MILLING AND BAKING PROPERTIES

22 FEB 94

NAME	YEARS TESTED	WHEAT PROTEIN %	FLOUR PROTEIN %	MILL YIELD %	FLOUR ASH %	MIXOGRAPH PEAK TIME min	MIXOGRAPH TOLERANCE SCORE	BAKING ABSORPTION %	BAKING BROMATE ppm	BAKING MIX TIME min	BAKING LOAF VOLUME cc	BAKING EXTERNAL APPEARANCE	BAKING CRUMB GRAIN	BAKING CRUMB TEXTURE
NE89522	1989	13.5	12.6		0.42	3.0	3.0	60.0	8.0	5.3	995	VG-	VG	VG+
	1990	11.8	10.1	69.9	0.33	5.5	3.0	59.0	0.0	6.2	900	F+	P+	P
	1991		11.2	73.4	0.46	4.0	4.0	60.0	15.0	6.0	1040	VG	F+	F-
	1992	13.0	11.4	71.1	0.34	3.7	3.0	60.0	10.0	5.3	945	G-	G	F+
	AVERAGE	12.8	11.3	71.5	0.39	4.1	3.3	59.8	8.3	5.7	970			
ARAPAHOE	1989	15.4	14.0	70.3	0.46	4.2	3.0	63.0	5.0	4.5	970	G	F+	G-
	1990	12.4	11.2	69.2	0.38	5.2	3.0	60.0	0.0	6.0	890	F+	F+	F-
	1991		11.8	71.5	0.48	3.5	4.0	61.0	12.0	5.8	930	G	G	G-
	1992	13.7	12.9	71.5	0.37	4.0	3.0	64.0	10.0	5.0	955	VG-	VG	VG
	AVERAGE	13.6	12.3	70.6	0.44	4.4	3.3	62.0	6.8	5.3	936			
SCOUT 66	1989	12.5	11.4	71.6	0.42	3.8	3.0	64.0	12.0	3.8	895	G-	VG-	VG-
	1990	12.4	11.2	71.9	0.37	3.2	3.0	61.0	8.0	3.7	915	F+	G	F+
	1991		11.9	74.4				61.0	0.0	4.0	810	G-	F+	F+
	1992	13.3	12.6	71.3	0.35	2.8	3.0	65.0	12.0	3.7	965	G	VG-	VG-
	AVERAGE	12.7	11.7	72.4	0.39	3.4	3.0	62.8	8.0	3.8	896			

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1993-94 State Variety Trial Results

VARIETY	SE*	SC	WC	PAN	AVG	RANK
	4**	3	11	8	26	
ARAPAHOE	45.75	49.77	54.90	51.38	51.82	7
RAWHIDE	44.55	46.67	56.52	55.30	53.16	6
REDLAND	44.83	49.43	59.40	55.49	54.81	5
SIOUXLAND	43.83	43.93	55.34	52.46	51.36	8
VISTA	45.28	50.50	57.43	58.37	55.05	4
NEKOTA	50.88	53.67	60.06	54.16	56.09	3
ALLIANCE	48.35	48.00	59.30	61.28	56.92	2
NIOBRARA	48.30	49.17	62.06	60.20	57.88	1

* District where the trials were grown
** Number of trials within the district

1991-1994 SUMMARY OF NIN YIELD TRIALS

VARIETY	YLDL	YLDC	YLDN	YLDMC	YLDS	YLDA	STATEAV	STAVG_NP91	STAVBYDS	RANKSTAVG	RANKBYDIS
ARAPAHOE	41.853	38.600	44.040	29.995	54.959	57.840	44.600	46.392	44.548	7	8
BUCKSKIN	34.065	35.523	35.808	32.955	50.884	58.713	40.549	42.228	41.325	11	11
CENTURA	38.390	40.330	43.198	42.705	53.977	59.503	45.512	47.375	46.351	5	3
VISTA	39.545	38.587	45.218	34.320	53.325	61.100	45.189	46.565	45.349	6	6
RAWHIDE	38.450	35.760	44.615	35.530	51.402	59.060	43.921	45.580	44.136	9	9
REDLAND	41.548	38.523	46.508	36.960	50.909	59.700	45.702	47.290	45.691	3	5
SIOUXLAND	38.128	39.517	45.540	33.680	56.034	62.397	45.547	47.035	45.883	4	4
TAM 107	38.030	31.483	40.525	32.650	55.005	58.553	42.202	43.808	42.708	10	10
TAM 200	32.385	28.450	35.350	39.780	42.407	58.297	38.642	40.317	39.445	12	12
NEKOTA	42.440	39.393	38.638	33.180	57.645	56.370	44.069	45.694	44.611	8	7
ALLIANCE	41.130	40.183	47.638	34.555	63.690	67.003	48.507	50.012	49.033	1	1
NIOBRARA	40.200	37.790	47.845	36.330	58.440	65.050	47.236	48.802	47.609	2	2